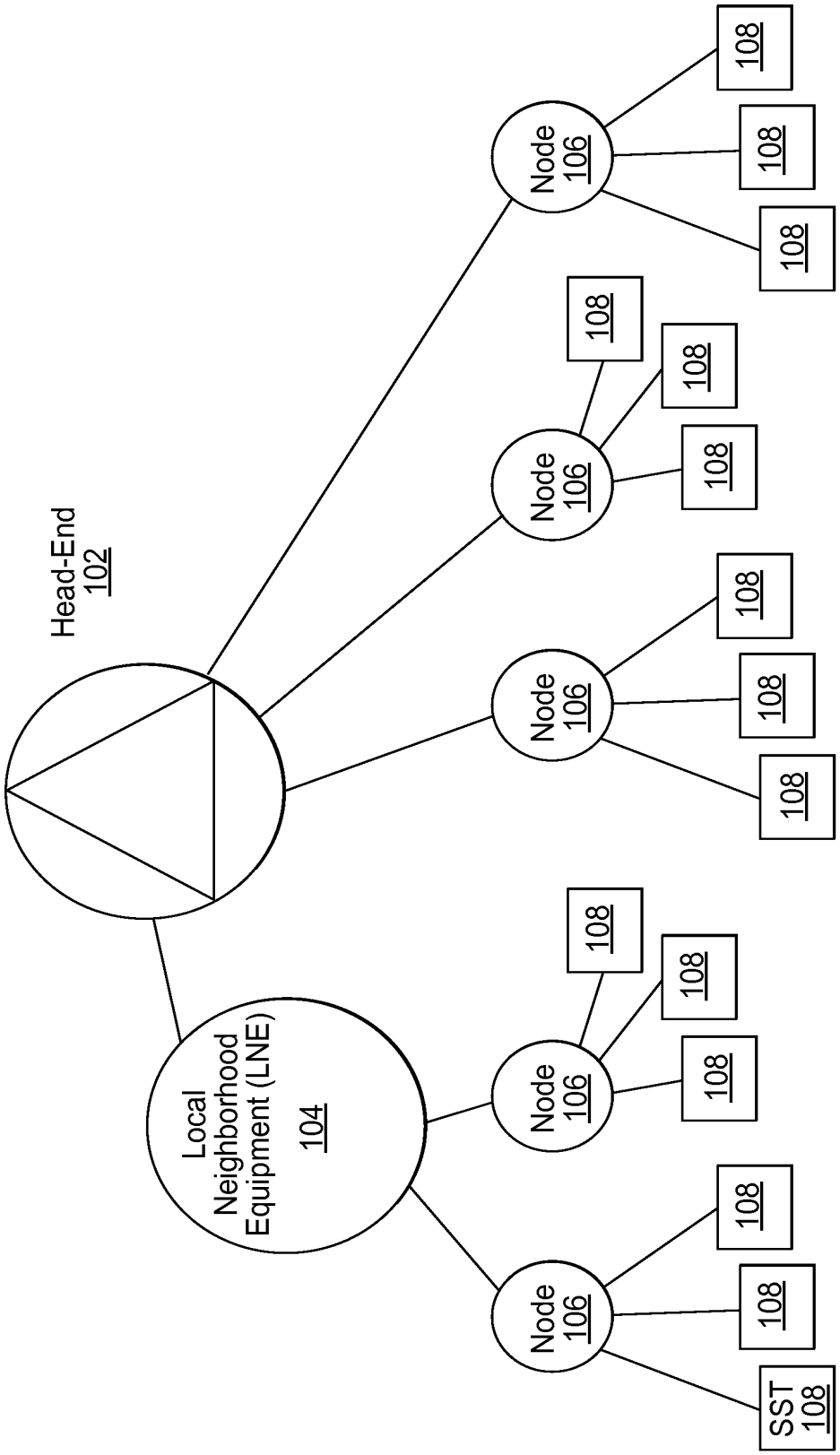
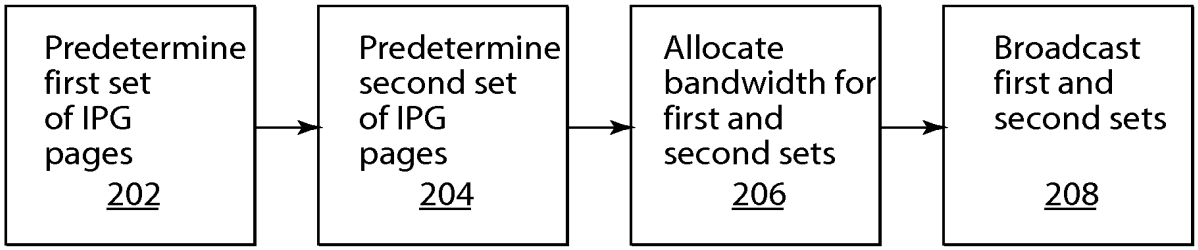
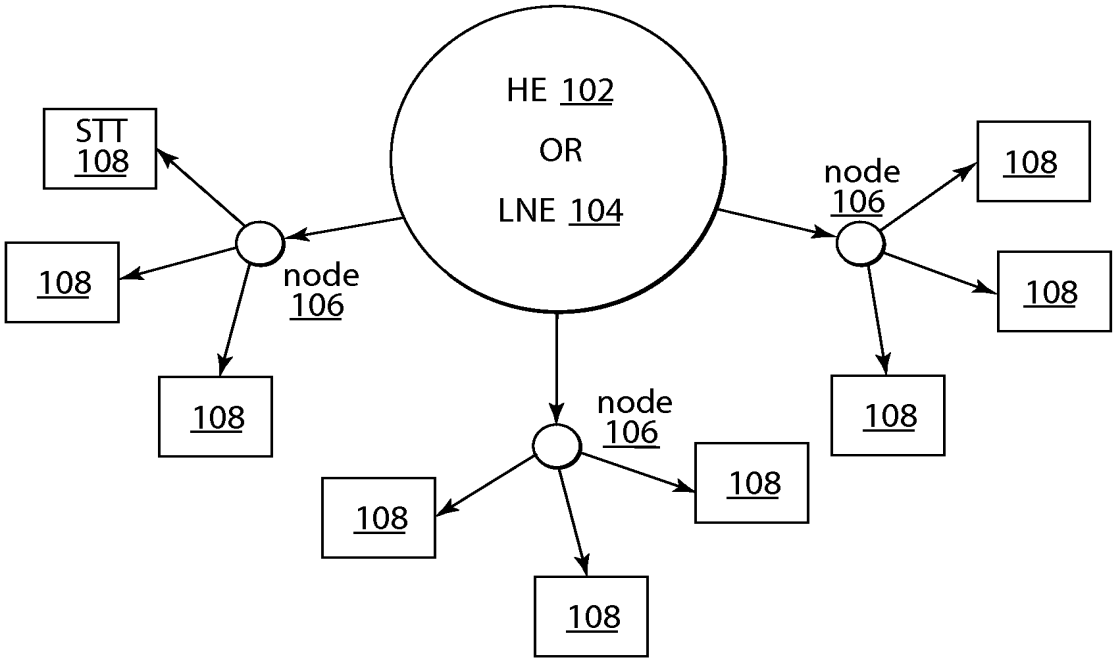

Head-End
102
Local
Neighborhood
Equipment (LNE)
104
Node
106
108
SST
108
100

FIG. 1



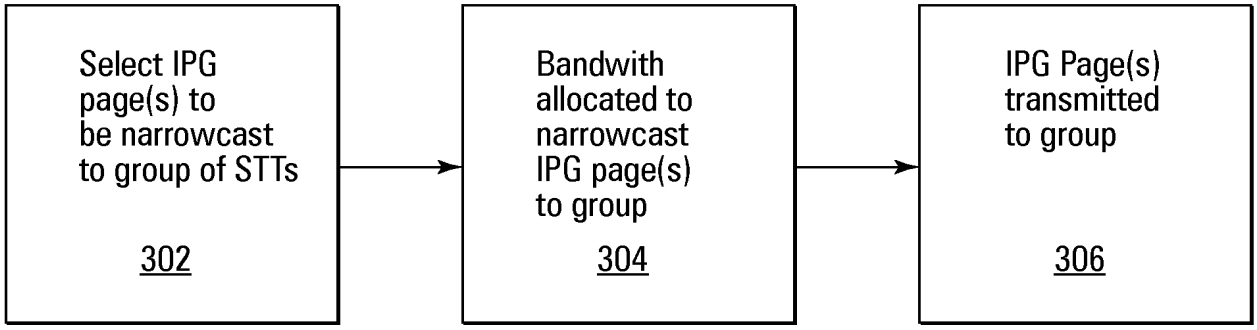
First Push Demandcast (Broadcast) Method 200

FIG. 2A



First Push Demandcast (Broadcast) Topology 250

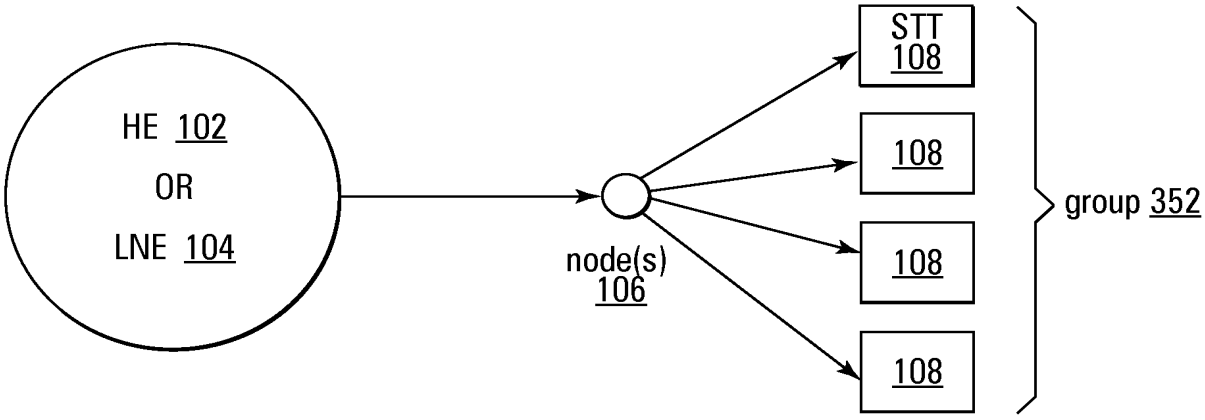
FIG. 2B



Second Push Demandcast (Narrowcast) Method

300

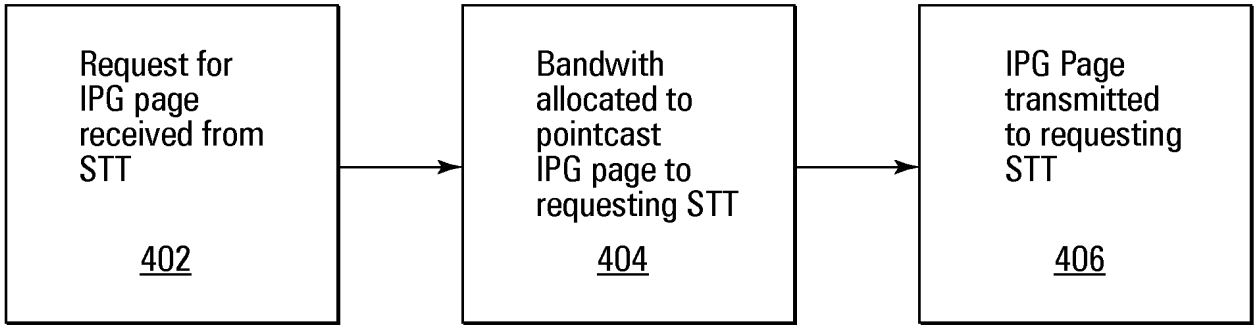
FIG. 3A



Second Push Demandcast (Narrowcast) Topology

350

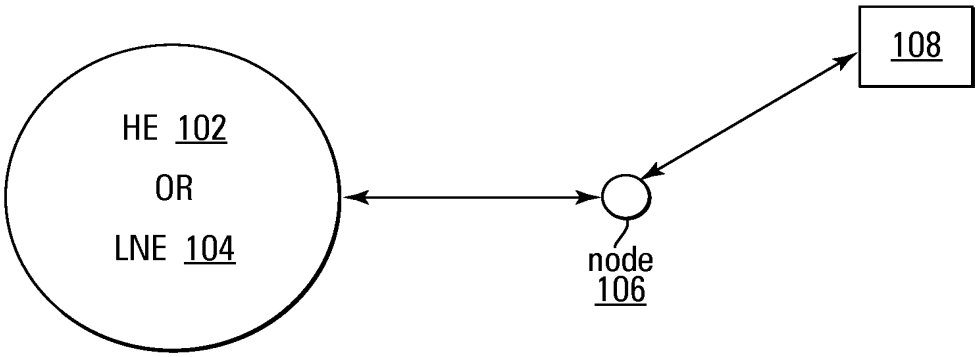
FIG. 3B



First Pull Demandcast (Pointcast) Method

400

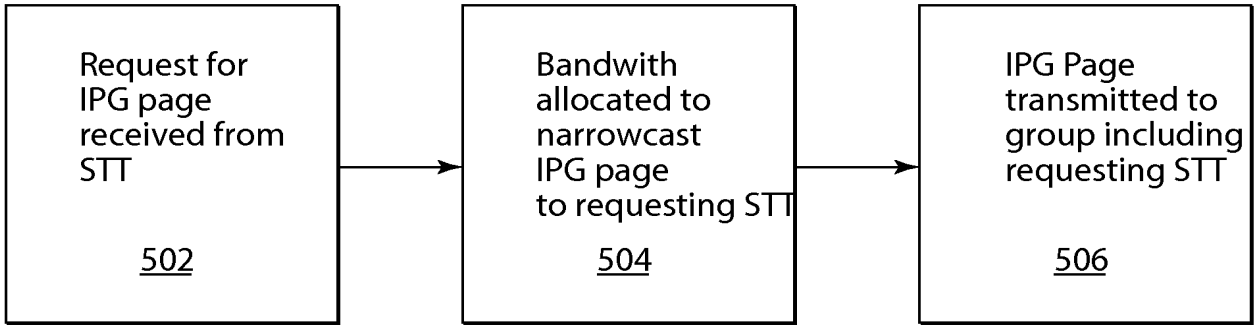
FIG. 4A



Pull Demandcast (Pointcast) Topology

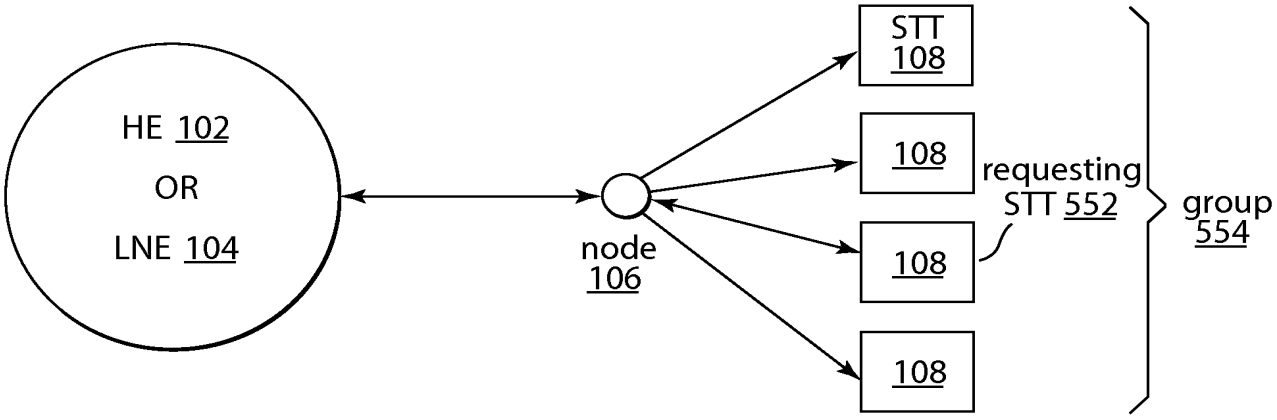
450

FIG. 4B



Second Pull Demandcast (Narrowcast) Method 500

FIG. 5A



Second Pull Demandcast (Narrowcast) Topology 550

FIG. 5B

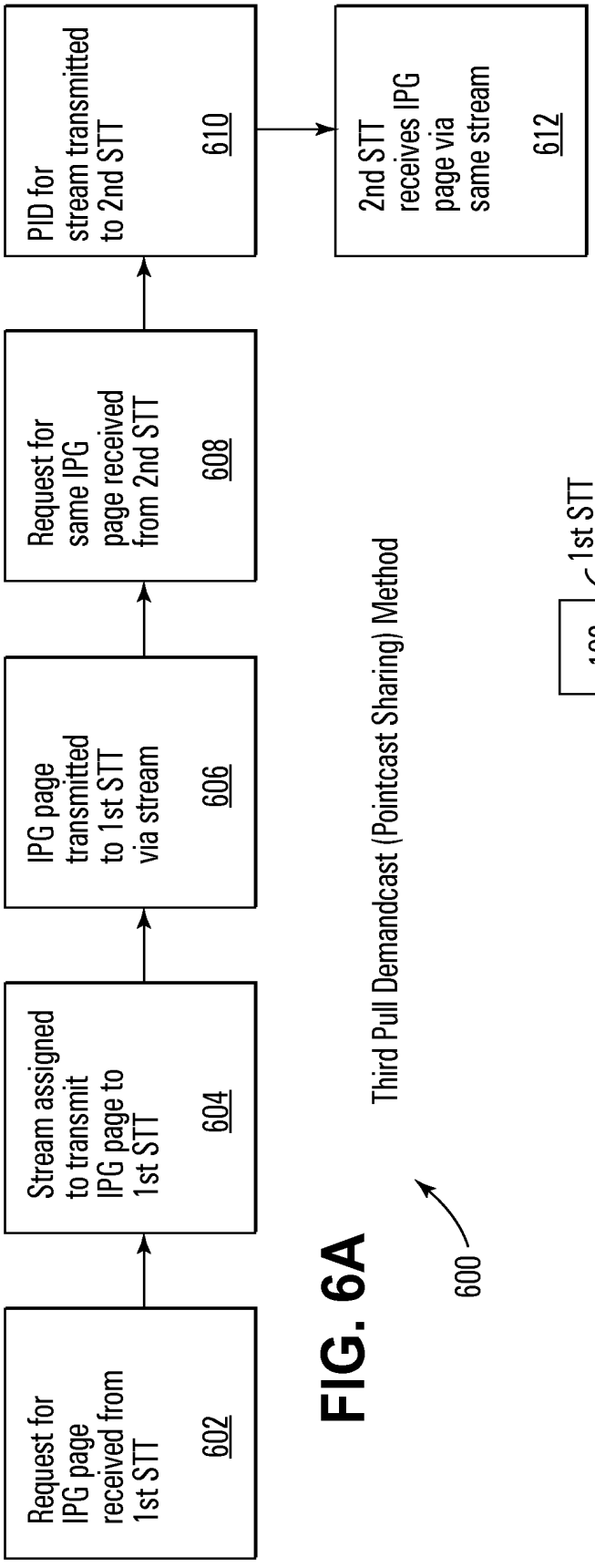

Request for IPG page received from 1st STT 602
Stream assigned to transmit IPG page to 1st STT 604
IPG page transmitted to 1st STT via stream 606
Request for same IPG page received from 2nd STT 608
PID for stream transmitted to 2nd STT 610
2nd STT receives IPG page via same stream 612
Third Pull Demandcast (Pointcast Sharing) Method
600

FIG. 6A

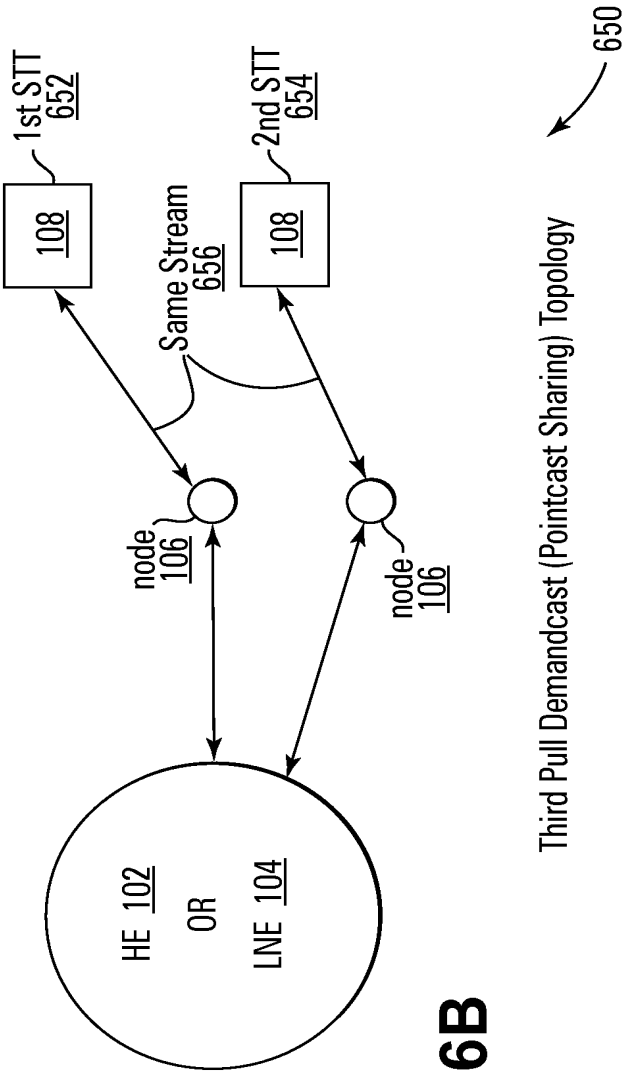

1st STT 652
108
Same Stream 656
2nd STT 654
108
node 106
node 106
HE 102
OR
LNE 104
Third Pull Demandcast (Pointcast Sharing) Topology
650

FIG. 6B

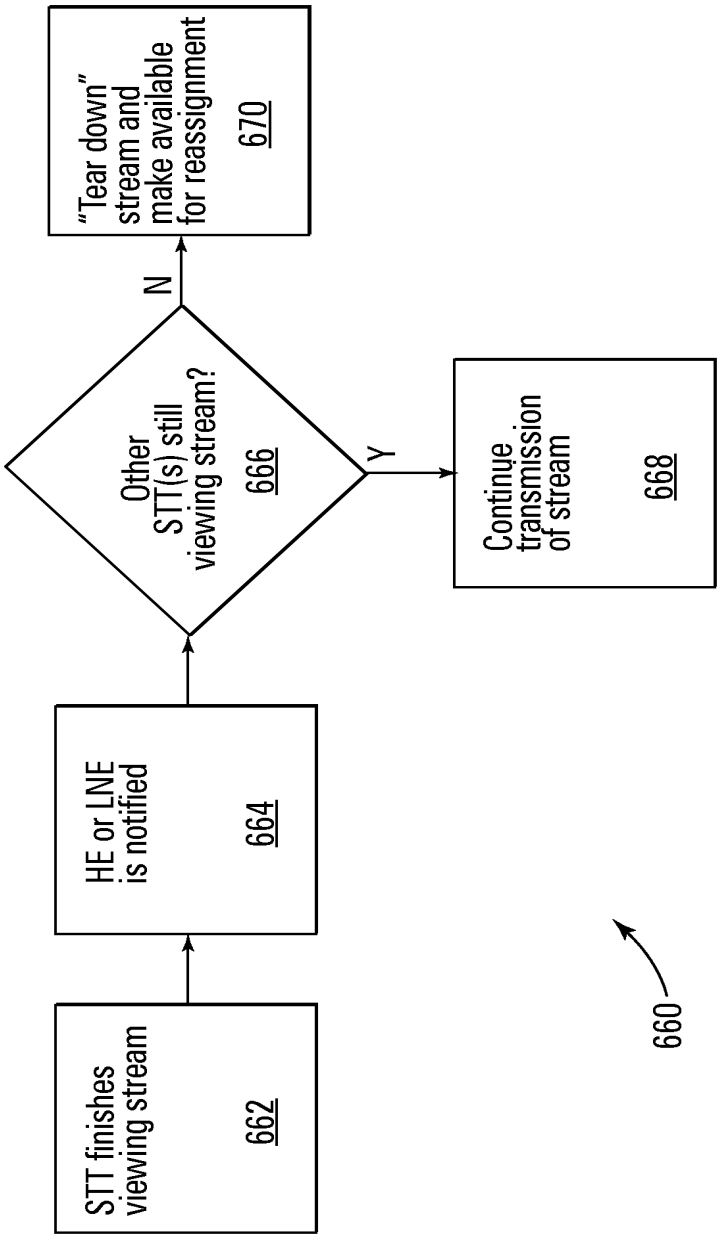

STT finishes viewing stream
662
HE or LNE is notified
664
Other STT(s) still viewing stream?
666
Y
N
Continue transmission of stream
668
"Tear down" stream and make available for reassignment
670
660

FIG. 6C

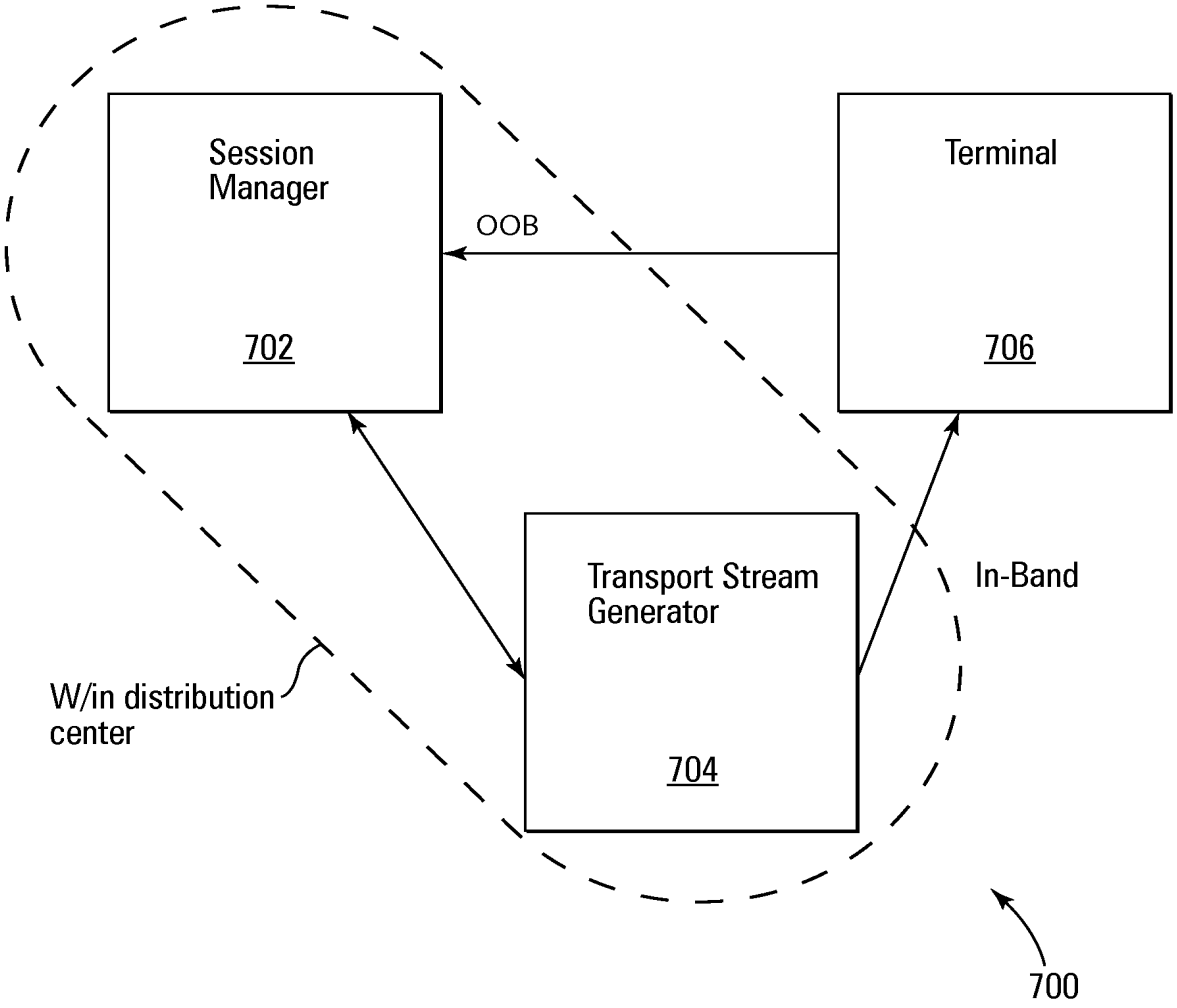
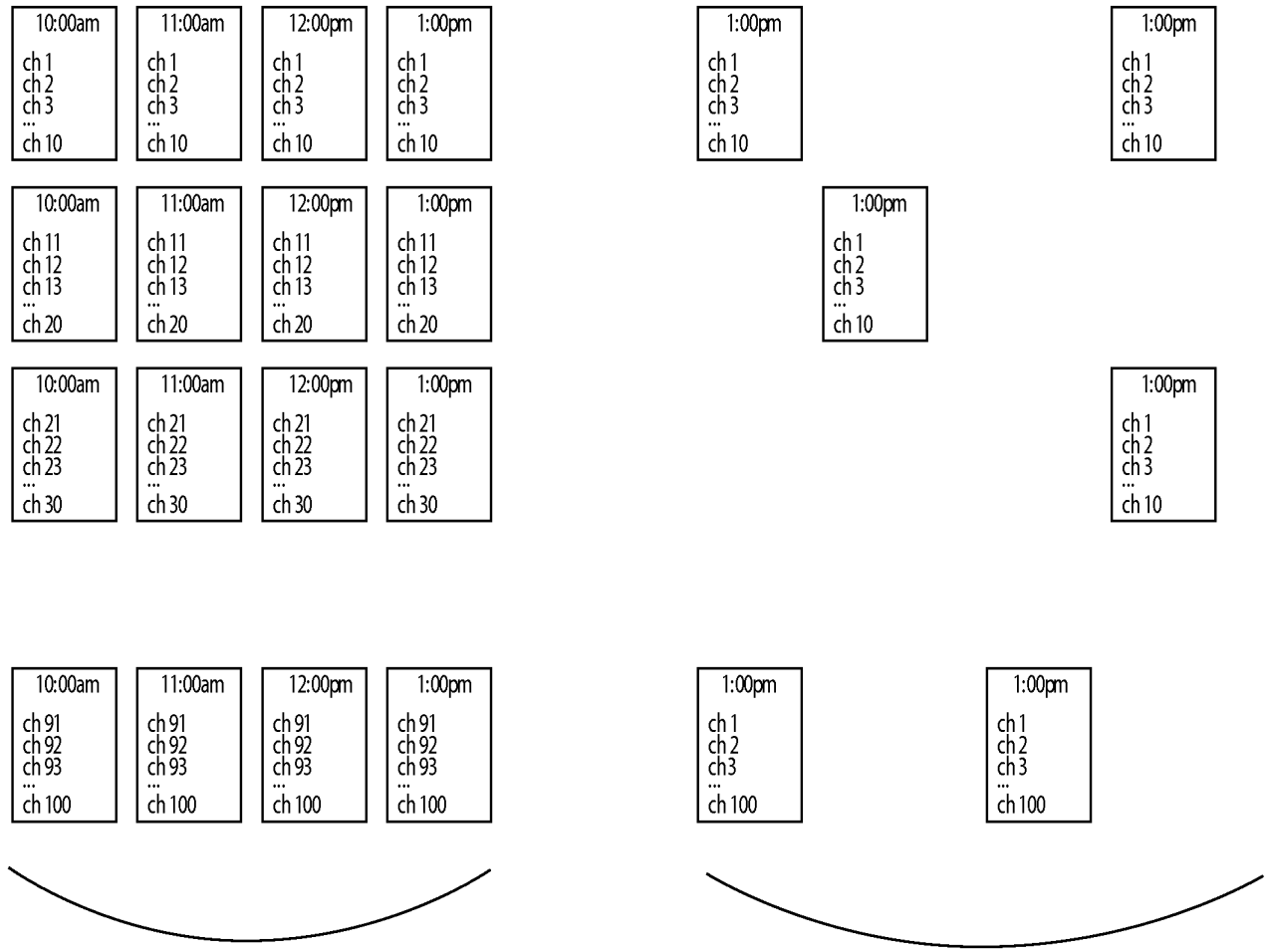

Session Manager
702
OOB
Terminal
706
Transport Stream Generator
704
In-Band
W/in distribution center
700

FIG. 7



Constant Broadcast Pages= 40 pages.
Pages are current time + 3 adjacent hours look-ahead in guide page matrix.
Pages are constantly broadcast.

Demandcast Pages= 30 pages.
Pages are anywhere in guide page matrix beyond constantly broadcast pages.

FIG. 8

# of pages in broadcast = # of constant broadcast pages+ # of demand cast pages

# of constant broadcast pages = (# of pages per time slot) x (# of time slots in constant broadcast)

Inventor: Donald F. Gordon et al.
Docket No.: 60136.0150US1
Title: DEMAND-CAST SYSTEM AND BANDWIDTH MANAGEMENT FOR DELIVERY OF INTERACTIVE PROGRAMMING
Serial No.: 09/538,562
Sheet 9 of 19
REPLACEMENT SHEET

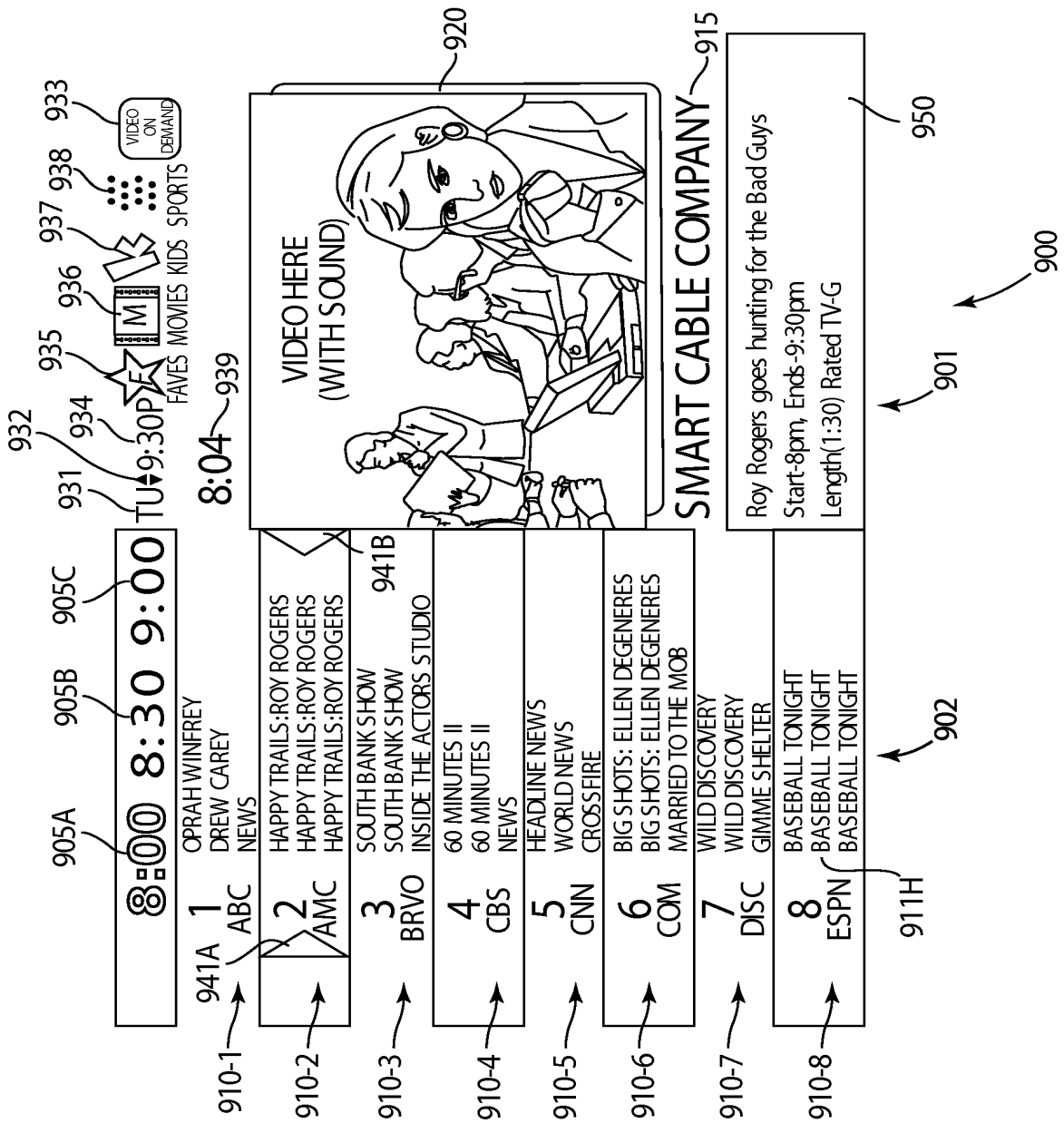

905A
905B
905C
8:00 8:30 9:00
931
TU 9:30P
932
934
935
936
937
938
933
FAVES MOVIES KIDS SPORTS
VIDEO ON DEMAND
8:04
939
920
VIDEO HERE (WITH SOUND)
SMART CABLE COMPANY
915
Roy Rogers goes hunting for the Bad Guys
Start-8pm, Ends-9:30pm
Length(1:30) Rated TV-G
950
901
900
941A
941B
911H
902
910-1
910-2
910-3
910-4
910-5
910-6
910-7
910-8
1 ABC OPRAH WINFREY DREW CAREY NEWS
2 AMC HAPPY TRAILS:ROY ROGERS HAPPY TRAILS:ROY ROGERS HAPPY TRAILS:ROY ROGERS
3 BRVO SOUTH BANK SHOW SOUTH BANK SHOW INSIDE THE ACTORS STUDIO
4 CBS 60 MINUTES II 60 MINUTES II NEWS
5 CNN HEADLINE NEWS WORLD NEWS CROSSFIRE
6 COM BIG SHOTS: ELLEN DEGENERES BIG SHOTS: ELLEN DEGENERES MARRIED TO THE MOB
7 DISC WILD DISCOVERY WILD DISCOVERY GIMME SHELTER
8 ESPN BASEBALL TONIGHT BASEBALL TONIGHT BASEBALL TONIGHT

FIG. 9

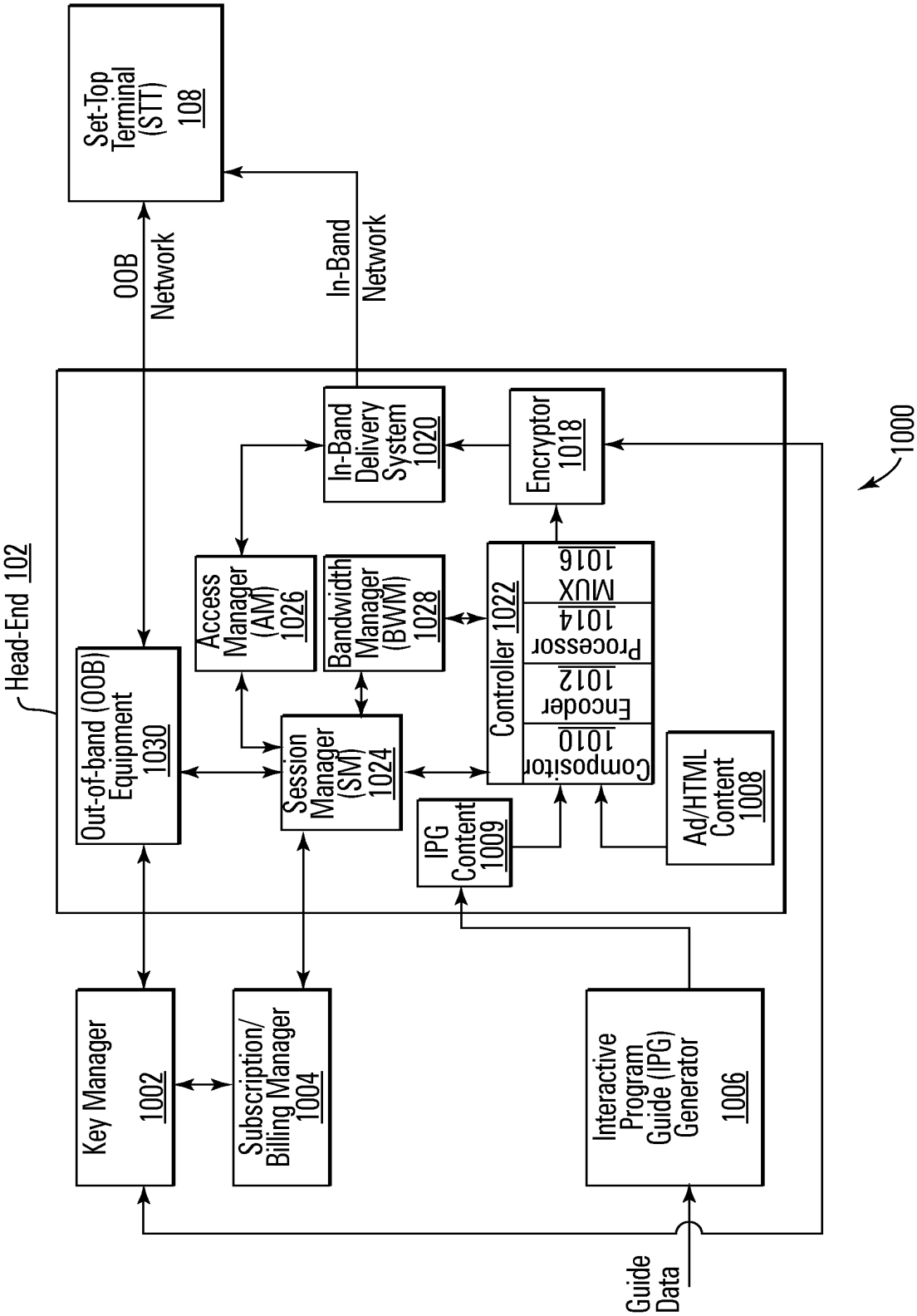

Set-Top Terminal (STT) 108
OOB Network
In-Band Network
Head-End 102
In-Band Delivery System 1020
Encryptor 1018
1000
Access Manager (AM) 1026
Bandwidth Manager (BWM) 1028
Controller 1022
Compositor 1010
Encoder 1012
Processor 1014
MUX 1016
Out-of-band (OOB) Equipment 1030
Session Manager (SM) 1024
IPG Content 1009
Ad/HTML Content 1008
Key Manager 1002
Subscription/ Billing Manager 1004
Interactive Program Guide (IPG) Generator 1006
Guide Data

FIG. 10

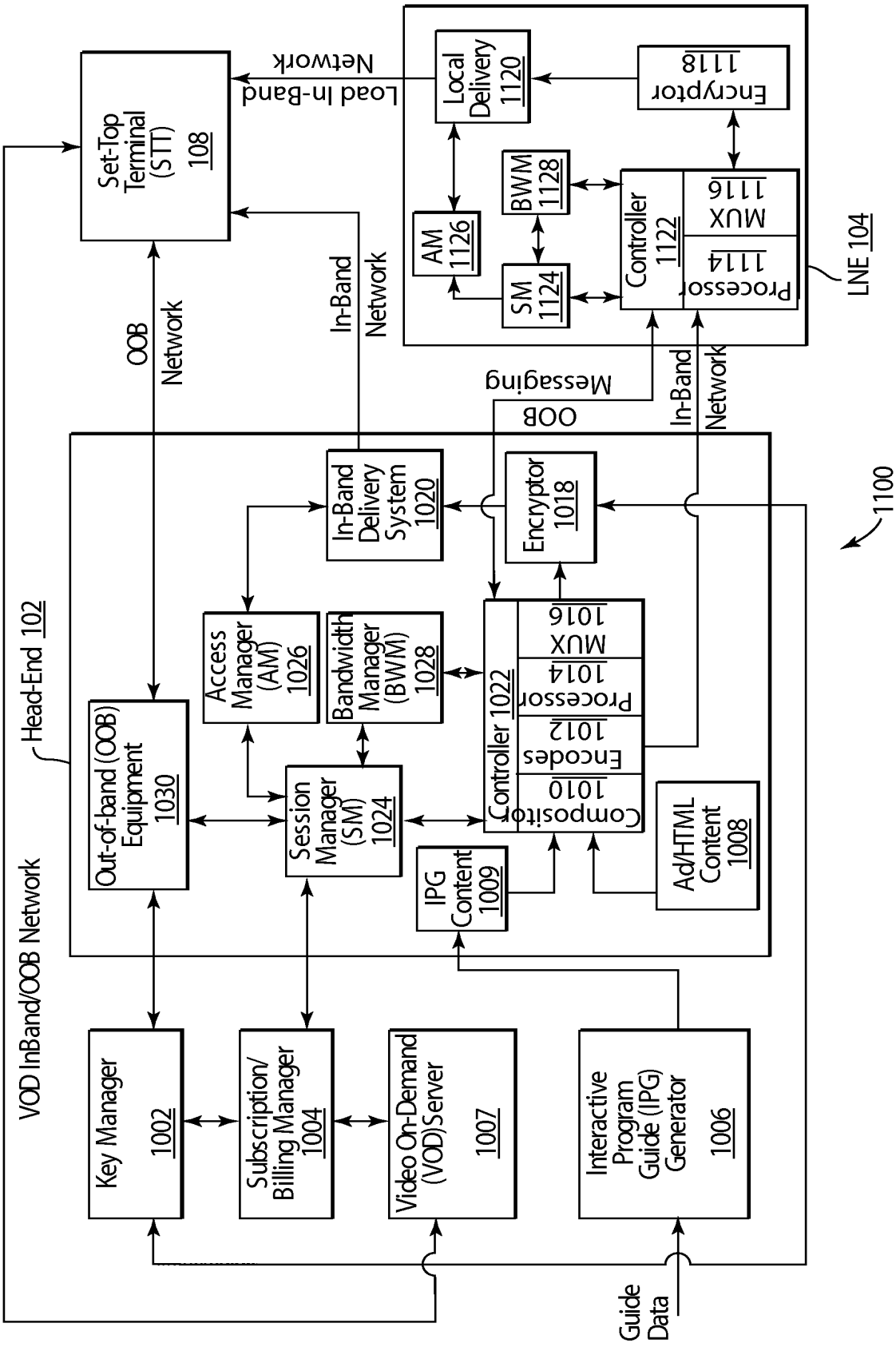

Set-Top Terminal (STT) 108
Load In-Band Network
Local Delivery 1120
Encryptor 1118
BWM 1128
AM 1126
Controller 1122
MUX 1116
Processor 1114
SM 1124
LNE 104
OOB Network
In-Band Network
Messaging
OOB
In-Band Network
In-Band Delivery System 1020
Encryptor 1018
1100
Head-End 102
Access Manager (AM) 1026
Bandwidth Manager (BWM) 1028
Controller 1022
MUX 1016
Processor 1014
Encodes 1012
Compositor 1010
Out-of-band (OOB) Equipment 1030
Session Manager (SM) 1024
IPG Content 1009
Ad/HTML Content 1008
VOD InBand/OOB Network
Key Manager 1002
Subscription/ Billing Manager 1004
Video On-Demand (VOD) Server 1007
Interactive Program Guide (IPG) Generator 1006
Guide Data

FIG. 11

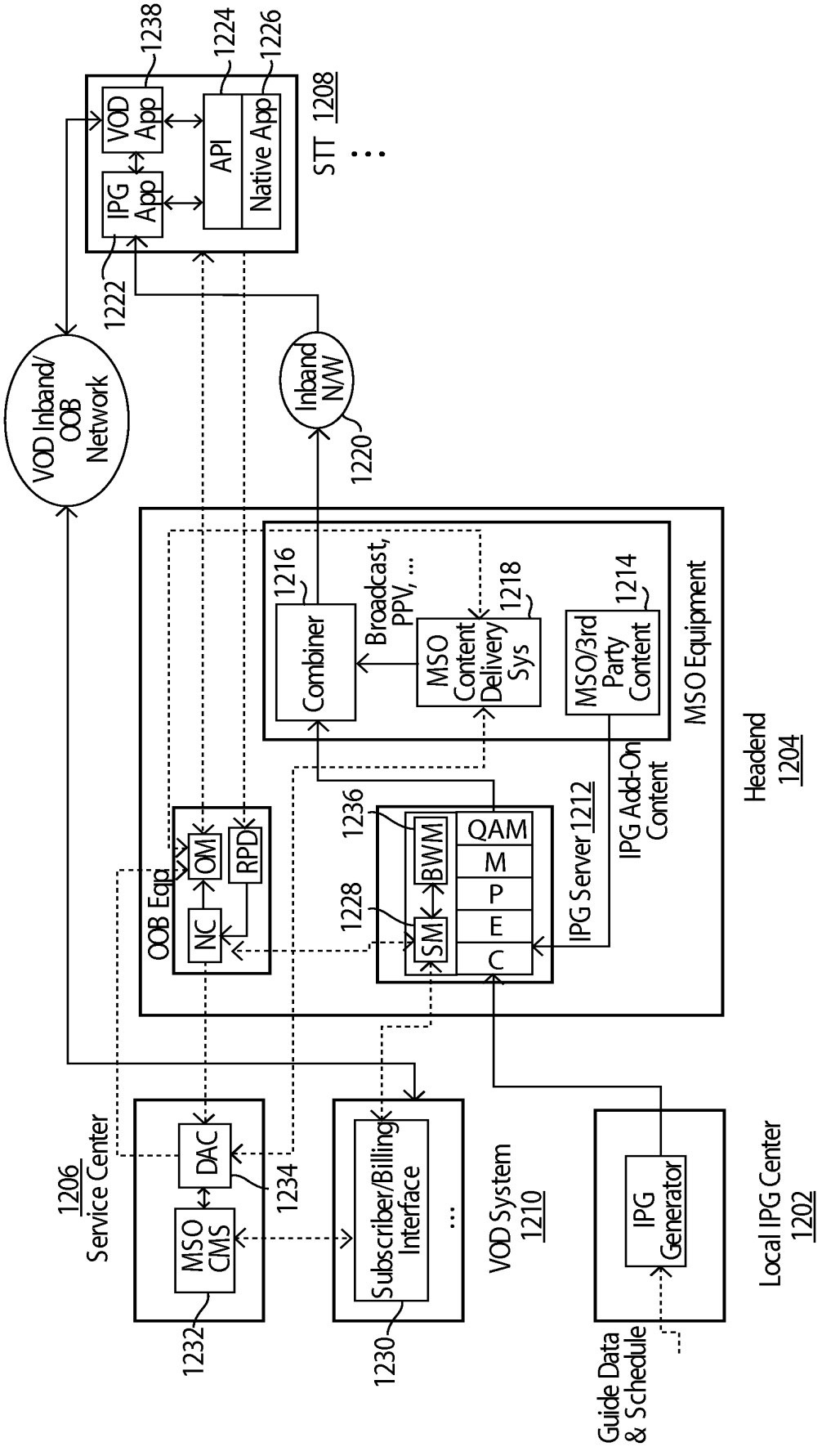

1238
1224
1226
VOD App
API
Native App
IPG App
STT 1208
1222
VOD Inband/ OOB Network
Inband N/W
1220
1216
Combiner
Broadcast, PPV, ...
1218
MSO Content Delivery Sys
1214
MSO/3rd Party Content
MSO Equipment
Headend 1204
OOB Eqp
OM
RPD
NC
1236
BWM
QAM
M
P
E
C
1228
SM
IPG Server 1212
IPG Add-On Content
1206 Service Center
DAC
MSO CMS
1234
1232
Subscriber/Billing Interface
1230
VOD System 1210
IPG Generator
Local IPG Center 1202
Guide Data & Schedule
1200

FIG. 12

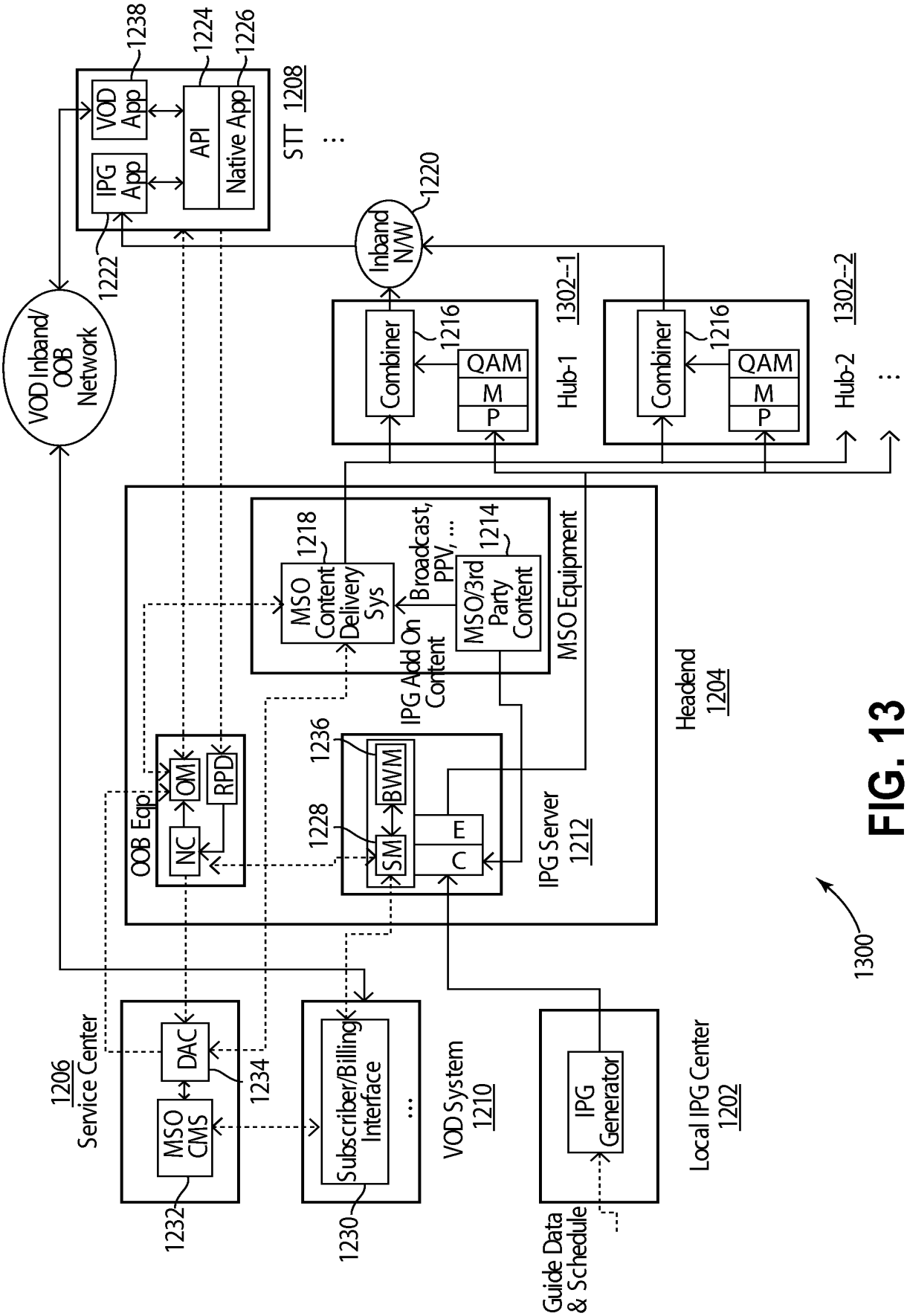

1238
1224
1226
VOD App
IPG App
API
Native App
STT 1208
1222
1220
Inband N/W
VOD Inband/ OOB Network
Combiner
1216
QAM
M
P
Hub-1 1302-1
Hub-2 1302-2
MSO Content Delivery Sys
1218
Broadcast, PPV, ...
MSO/3rd Party Content
1214
IPG Add On Content
MSO Equipment
Headend 1204
OOB Eqp
OM
RPD
NC
1236
BWM
1228
SM
E
C
IPG Server 1212
1206 Service Center
DAC
1234
MSO CMS
1232
Subscriber/Billing Interface
1230
VOD System 1210
IPG Generator
Local IPG Center 1202
Guide Data & Schedule
1300

FIG. 13

TSG to-Terminal Communication:

Contents of Demand-Cast Index Table

table version number (incremented when table content changes)
list of available demand-cast streams
IP address for the source TSG
MUX channel number within the source TSG
time of day and day of week

FIG. 14

Terminal to-SM Communication:

Message Content

demand-cast stream ID
terminal ID
IP address for the source TSG
MUX channel number within the source TSG
message information (acquisition, release, or request)

FIG. 15

SM to-TSG Communication:

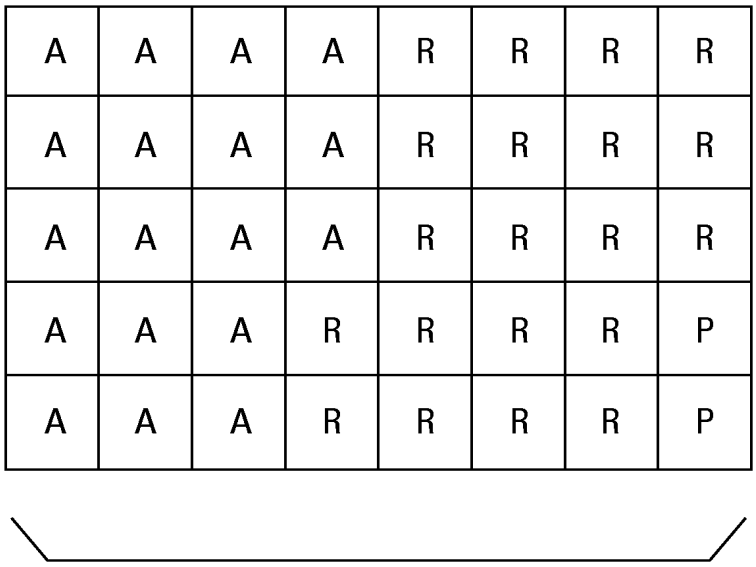
Message Content
demand-cast stream ID
MUX channel number within the source TSG
message/command (stream released, stream requested, or reset)

FIG. 16

TSG to-SM Communication:

Message Content
demand-cast stream ID
MUX channel number within the source TSG
IP address for the source TSG
acknowledgment (of stream release, of stream request, or of reset)

FIG. 17



A: acquired streams are in mux and in demand-cast index table

R: released streams are in mux and in demand-cast index table. They can be turned into passive streams.

P: passive streams are technically released. They are not in the demand-cast index table. They are removable.

TSG Demand-cast Stream Status

FIG. 18

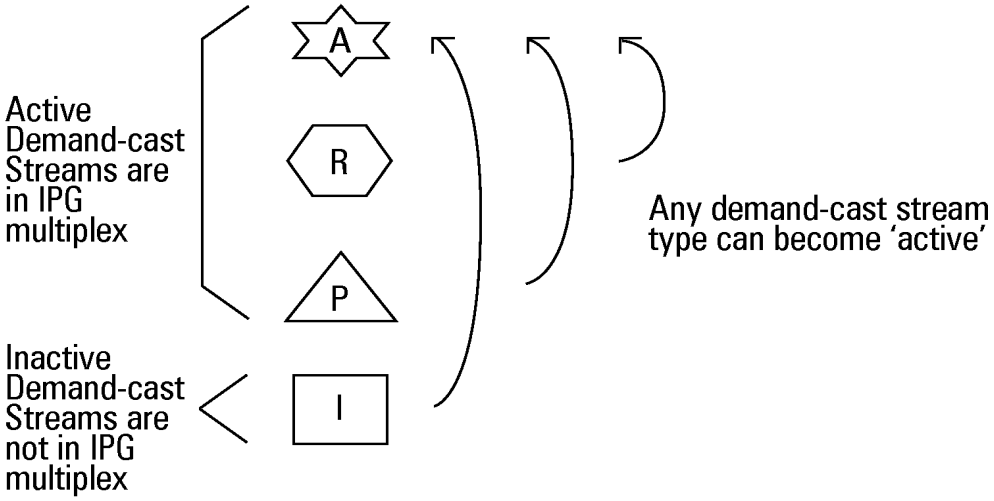

A
R
P
I
Active Demand-cast Streams are in IPG multiplex
Inactive Demand-cast Streams are not in IPG multiplex
Any demand-cast stream type can become 'active'

FIG. 19

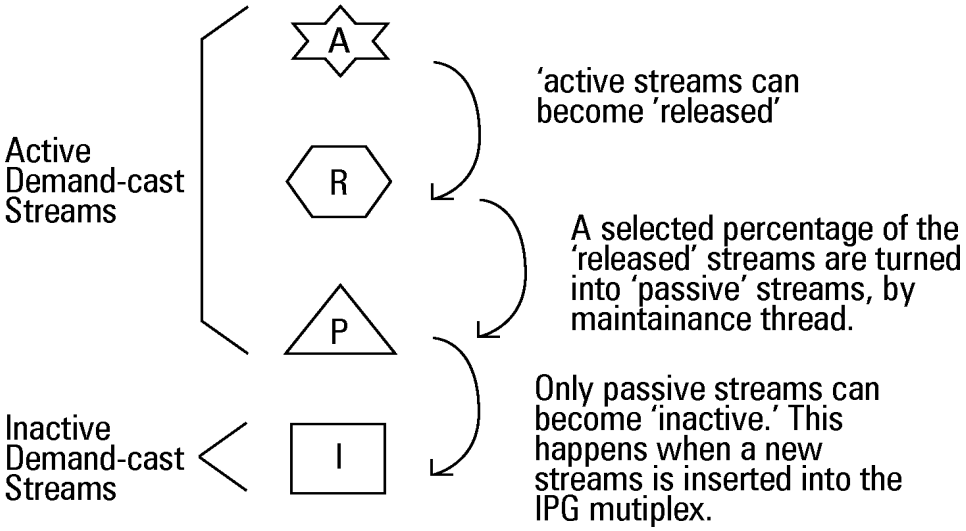

A
R
P
I
Active Demand-cast Streams
Inactive Demand-cast Streams
'active streams can become 'released'
A selected percentage of the 'released' streams are turned into 'passive' streams, by maintainance thread.
Only passive streams can become 'inactive.' This happens when a new streams is inserted into the IPG mutiplex.

FIG. 20